IN THE CLAIMS:

1. (Previously Presented) A programmable alarm clock system for waking a sleeper during a selected period of sleep, said programmable alarm clock system comprising:

a sleep analyzing server;

at least one sleep activity sensor attachable to a head of a sleeper;

a receiver receiving sleep activity signals from at least one said sleep activity sensor;

a local computer receiving a wake up time and received said sleep activity signals and sending said received sleep activity signals remotely to said sleep analyzing server; and

a remotely triggered local alarm device sounding a wake up alarm responsive to a determination from said local computer that said sleeper should be awoken.

2. (Original) A programmable alarm clock system as in claim 1, wherein said sleep activity is brain activity and said sleep analyzing server analyzes received brain activity signals and identifies periods of slow wave sleep.

3. (Original) A programmable alarm clock system as in claim 1, wherein said sleep activity is brain activity and said sleep analyzing server analyzes received brain activity signals and identifies periods of REM sleep and non-REM sleep.

4. (Original) A programmable alarm clock system as in claim 1, wherein said at least one sensor measures brain activity using electroencephelography.

5. (Original) A programmable alarm clock system as in claim 1, wherein said at least one sensor measures brain activity using polysomnography.

6. (Previously Presented) A programmable alarm clock system as in claim 1, wherein said at least one sensor is a plurality of sensors measuring brain activity and in wireless communication with said local computer.

7. (Previously Presented) A programmable alarm clock system as in claim 1, wherein said at least one sleep activity sensor is one or more eyelid sensors are attached to said sleeper's eyelids measuring said eye movement, said receiver receiving sensor signals from said eyelid sensors.

8. (Previously Presented) A programmable alarm clock system as in claim 1, wherein said local computer is further provided with a selected sleep activity, the sleep analyzing server sending information about identified periods of said selected sleep activity to said local computer and said local computer determines from received said information when to trigger said wake up alarm relative to said wake up time.

9. (Previously Presented) A programmable alarm clock system as in claim 8, wherein when said local computer determines that said sleeper is in an identified period of said selected sleep activity at said wake up time, said local computer triggers said wake up alarm.

10. (Previously Presented) A programmable alarm clock system as in claim 9, wherein when said local computer determines that said sleeper is in an other sleep activity period identified as having a sleep activity other than said selected sleep activity at said wake up time, said local computer triggers said wake up alarm at an end to said other sleep activity period.

11. (Previously Presented) A programmable alarm clock system as in claim 9, wherein when said local computer determines that said sleeper is in an other sleep activity period

identified as having a sleep activity other than said selected sleep activity at said wake up time, said local computer postpones triggering said alarm until a next selected sleep period.

12. (Previously Presented) A programmable alarm clock system as in claim 10, wherein when said local computer determines that said sleeper is in an other sleep activity period identified as having a sleep activity other than said selected sleep activity at said wake up time, if said local computer determines that the next selected sleep activity period is expected to occur beyond a selected margin, said local computer triggers said wake up alarm.

13. (Original) A programmable alarm clock system as in claim 8, wherein said selected sleep activity is REM sleep.

14. (Original) A programmable alarm clock system as in claim 8, wherein said selected sleep activity is non-REM sleep.

15. (Previously Presented) A programmable alarm clock system as in claim 6, wherein the server comprises:

a receiving module receiving sleep activity;

a signal analyzer charting sleep data and identifying sleep periods as being either selected activity sleep periods or other activity sleep periods;

a signal labeler labeling selected activity sleep periods and other activity sleep periods; and

a sender sending labeled said charts to the local computer.

16. (Previously Presented) A programmable alarm clock system as in claim 15, further comprising:

a signal processing unit receiving analog signals representative of said sleep activity and providing digital sleep data to the signal analyzer responsive to said analog signals.

17. (Previously Presented) A programmable alarm clock system as in claim 16, further comprising:

one or more sleep activity sensors attached to the head of said sleeper, each of said one or more sensors sending sleep activity signals to said receiving module.

18. (Previously Presented) A programmable alarm clock system as in claim 17, wherein at least one of said one or more sleep activity sensors is sensing brain activity.

19. (Original) A programmable alarm clock system as in claim 18, wherein the signal analyzer identifies sleep periods based upon selected brain activity prototypes.

20. (Previously Presented) A programmable alarm clock system as in claim 17, wherein at least one of said one or more sense activity sensors senses eye movement.

21. (Currently Amended) A method of operating a programmable alarm clock, said method comprising the steps of:

a) receiving brain ~~sleep~~ activity signals and sending the brain activity signals to a remotely connected server;

b) digitizing said brain ~~sleep~~ activity signals;

c) analyzing said digitized brain ~~sleep~~ activity signals to identify selected sleep activity periods and other sleep activity periods;

d) waiting for a designated wake up time;

e) determining whether said brain ~~sleep~~ activity signals indicate that a sleeper is in a period of said selected sleep activity or a period of other sleep activity at said designated wake up time; and

f) sounding an alarm at said designated wake up time if said brain ~~sleep~~ activity signals indicate said selected sleep activity.

22. (Currently Amended) A method of operating a programmable alarm clock as in claim 21, when said brain ~~sleep~~ activity signals indicate said other sleep activity period at said wake up time, said method further comprising the steps of:

g) determining an alarm time to sound said alarm; and

h) sounding said alarm at said alarm time.

23. (Previously Presented) A method of operating a programmable alarm clock as in claim 22, wherein the determining step (g) comprises the steps of:

i) determining whether a wait margin has been selected, the alarm time being set to said designated wake up time when no wait margin has been selected;

ii) setting the alarm time when said next expected selected sleep activity period is within the wait margin; and

iii) if said other sleep activity continues beyond said wait margin, setting said alarm at the end of said wait margin.

24. (Cancelled).

25. (Currently Amended) A method of operating a programmable alarm clock as in claim [[24]] 23, wherein the analyzing step (c) comprises the steps of:

i) creating a prototype chart of said digitized brain activity signals; and

ii) labeling periods in said prototype chart as being selected sleep activity periods and other sleep activity periods.

26. (Previously Presented) A method of operating a programmable alarm clock as in claim 25, wherein said prototype chart is sent to a local computer.

27. (Previously Presented) A method of operating a programmable alarm clock as in claim 26, wherein in the step (e) of determining whether sleep activity signals indicate that the sleeper is in the selected sleep activity period, said local computer interrogates the labeled prototype chart, determining therefrom whether the designated wake up time is in one of the selected sleep activity periods.

28. (Original) A method of operating a programmable alarm clock as in claim 27, wherein the local computer sends a trigger to an alarm clock in the steps (f) and (h) of sounding the alarm, the alarm clock sounding the alarm responsive to said trigger.

29. (Original) A method of operating a programmable alarm clock as in claim 28, wherein the selected sleep activity is non-REM sleep.

30. (Original) A method of operating a programmable alarm clock as in claim 28, wherein the selected sleep activity is REM sleep.

31. (Original) A method of operating a programmable alarm clock as in claim 28, wherein the selected sleep activity is slow wave sleep.

32. (Previously Presented) A computer program product for operating a programmable alarm clock system, said computer program product comprising a computer usable

medium having computer readable program code thereon, said computer readable program code comprising:

computer readable program code means for digitizing sleep activity signals;

computer readable program code means for analyzing digitized said sleep activity signals to identify selected sleep periods and non-selected sleep periods;

computer readable program code means for determining whether to send a trigger responsive to a designated wake up time is in a selected sleep period or non-selected sleep period; and

computer readable program code means for sounding an alarm responsive to said trigger.

33. (Previously Presented) A computer program product for operating a programmable alarm clock system as in claim 32, wherein said computer readable program code means for determining an alarm time comprises:

computer readable program code means for determining whether a wait margin has been selected, a trigger time being set to said designated wake up time when no wait margin has been selected;

computer readable program code means for setting said trigger time as a next expected selected sleep activity period when said next expected selected sleep activity period is determined to be expected to occur within the wait margin; and

computer readable program code means for setting said trigger time at the end of said wait margin, when a non-selected sleep activity period is expected to extend through said wait margin.

34. (Original) A computer program product for operating a programmable alarm clock system as in claim 33, further comprising:

computer readable program code means for forwarding received sleep activity signals to a remotely connected server.

35. (Previously Presented) A computer program product for operating a programmable alarm clock system as in claim 34, wherein the sleep activity signals are brain activity signals and said computer readable program code means for analyzing digitized brain activity comprises:

computer readable program code means for creating a prototype chart of said digitized brain activity signals;

computer readable program code means for labeling periods in said prototype chart as being selected sleep periods and non-selected periods; and

computer readable program code means for sending each labeled said prototype chart to a local computer.

36. (Previously Presented) A computer program product for operating a programmable alarm clock system as in claim 35, wherein said computer readable program code means for sounding said alarm comprises:

computer readable program code means for causing said local computer to send said trigger to a local alarm device.

37. (Previously Presented) A computer program product for operating a programmable alarm clock system as in claim 34, wherein said sleep activity signals are indicated by eye movement.

38. (Previously Presented) A computer program product for operating a programmable alarm clock system as in claim 37, wherein said selected sleep activity is REM sleep.

39. (Previously Presented) A computer program product for operating a programmable alarm clock system as in claim 37, wherein said selected sleep activity is non-REM sleep.

40. (Previously Presented) A computer program product for operating a programmable alarm clock system as in claim 37, wherein said selected sleep activity is slow wave sleep.